

# The Use of the MMPI-2 Infrequency–Psychopathology Scale in the Assessment of Posttraumatic Stress Disorder in Male Veterans<sup>1</sup>

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This study evaluated the use of the *F<sub>p</sub>* (Infrequency–Psychopathology) scale of the Minnesota Multiphasic Personality Inventory–2 (MMPI-2) as a measure of symptom overreporting among 423 service-seeking male veterans with and without PTSD. Results were consistent with several predictions based on the logic of the *F<sub>p</sub>* scale. *F<sub>p</sub>* produced lower scores for PTSD and non-PTSD patients than the other two MMPI-2 measures of infrequent responding; *F* and *F<sub>B</sub>*. *F<sub>p</sub>* also resulted in fewer invalid protocols than did *F* or *F<sub>B</sub>*. Finally, *F<sub>p</sub>* yielded lower correlations with MMPI-2 and other measures of psychopathology than did *F* or *F<sub>B</sub>*. Consistent with previous studies, compensation-seeking status was associated with extreme elevations across clinical and validity scales. Contrary to previous findings, however, compensation-seeking veterans were also more likely to receive a PTSD diagnosis. Implications for the relationship between compensation seeking and symptom overreporting are discussed.

**KEY WORDS:** MMPI-2; *F<sub>p</sub>*; posttraumatic stress disorder; symptom overreporting.

Combat veterans evaluated for posttraumatic stress disorder (PTSD) frequently exhibit extreme elevations across assessment measures. These pose a substantial challenge to the assessment of PTSD in veterans that is complicated further by a pattern of elevations on the MMPI/MMPI-2 validity scales consistent with symptom overreporting (e.g., Elhai, Gold, Sellers, & Dorfman, 2001; Franklin, Repasky, Thompson, Shelton, & Uddo, 2002; Frueh, Gold, & de Arellano, 1997). Although some researchers have argued that this response pattern reflects the severity of PTSD in veterans (e.g., Fairbank, Keane, & Malloy, 1983; Hyer et al., 1988), a body of

research has accumulated suggesting that it is at least partially due to symptom overreporting by a subset of veterans (Elhai, Gold, Frueh, & Gold, 2000; Frueh et al., 1997; Frueh, Smith, & Barker, 1996; Smith & Frueh, 1996). Veterans have numerous incentives to overreport symptoms of PTSD, including gaining financial benefits (Lees-Haley, 1986; Resnick, 1997), obtaining treatment (Smith & Frueh, 1996), and avoiding criminal charges (Lees-Haley, 1986; Resnick, 1997). As a result, symptom overreporting is thought to increase rates of false-positive PTSD diagnoses. In addition, symptom overreporting may affect rates of false-negative diagnoses as clinicians become skeptical of veteran's reports of PTSD symptoms (Richman, Frueh, & Libet, 1994). Differentiating symptom overreporting from actual psychopathology, therefore, is critical for correctly diagnosing PTSD.

The MMPI/MMPI-2 contains a number of scales designed to detect symptom overreporting. These include the infrequency scale (*F*), the infrequency-back scale (*F<sub>B</sub>*), Gough's Dissimulation Index (*F-K*), Gough's Dissimulation scale (*Ds*), total Obvious minus total Subtle (*O-S*),

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and the relatively new infrequency-psychopathology scale ( $F_P$ ). Of these,  $F$  and  $F_B$  are the most commonly used scales in the detection of symptom overreporting (Butcher et al., 2001). Their utility in PTSD assessment, however, is limited by their tendency to confound overreporting with actual psychopathology in populations with high base rates of psychopathology, like PTSD. As a result,  $F$  and  $F_B$  are extremely elevated in studies of veterans diagnosed with PTSD (mean  $F$   $T$ -scores range from 70 to 102, mean  $F_B$  ranges from 82 to 94) with a substantial minority of scores at the maximum of 120 on both scales (Albrecht et al., 1994; Arbisi & Ben-Porath, 1997; Beckham, Braxton, Feldman, Lytle, & Palmer, 1997; Elhai et al., 2000; Frueh et al., 1997).

To address this problem, Arbisi and Ben-Porath (1995) developed the  $F_P$  scale from 27 items that were endorsed by 20% or fewer of a sample of psychiatric inpatients. In a sample of psychiatric inpatients (Arbisi & Ben-Porath, 1995), mean  $F_P$  scores were significantly lower than were  $F$  and  $F_B$  scores. As a result, fewer protocols were ruled invalid using  $F_P$  than with  $F$  or  $F_B$ . In a follow-up study of veterans diagnosed with PTSD, major depressive disorder, substance abuse, schizophrenia, and bipolar disorder, Arbisi and Ben-Porath (1997) reported that  $F_P$  yielded significantly lower scores than  $F$  and  $F_B$  at each diagnostic category. In addition, although  $F$  and  $F_B$  were elevated for each diagnostic category,  $F_P$  yielded  $T$ -scores less than 70 for every disorder except schizophrenia. This suggests that  $F_P$  was relatively consistent across diagnostic categories and was less susceptible to the effects of actual psychopathology.

More recently, Elhai, Ruggiero, Frueh, Beckham, and Gold (2002) reported initial validation data on the  $F_{PTSD}$  scale, a validity scale developed using the methodology utilized by Arbisi and Ben-Porath (1995), but designed to detect infrequent responses among veterans diagnosed with PTSD. The  $F_{PTSD}$  scale has considerable item-overlap with  $F_P$  (20 of 32 items). Nonetheless,  $F_{PTSD}$  yielded lower scores than  $F$ ,  $F_B$ , or  $F_P$  among a sample of veterans with PTSD and was better able to discriminate malingered PTSD from actual PTSD. This relationship appears to be incremental with  $F_{PTSD}$  outperforming  $F_P$  whereas both outperform  $F$  and  $F_B$ .

$F_P$  has been evaluated in several studies of veterans either diagnosed with PTSD or assessed for PTSD. Frueh et al. (1997) examined the effects of compensation-seeking status on MMPI-2 validity scales among 125 veterans evaluated for PTSD. Compensation-seeking (CS) has been used as an indirect measure of symptom overreporting because it is assumed that veterans seeking a service-related disability have greater secondary gains than non-compensation-seeking (NCS) veterans. It should

be noted, however, that CS is at best an inexact measure of symptom overreporting because it is just as plausible that CS is merely reflective of increased severity of psychiatric symptoms. CS veterans assessed for PTSD scored significantly higher than did NCS veterans on all validity scales including  $F_P$ . Among CS veterans,  $F_P$  yielded the lowest elevation of the standardized validity indices, with a mean  $T$ -score of 78. Scores for  $F$ ,  $F_B$ , and  $D_s$  were 107, 112, and 91, respectively.  $F-K$  and  $O-S$  were also extremely elevated with mean scores of 14 and 219, respectively. Among NCS veterans  $F_P$  was the only scale with a  $T$ -score below 70.  $F_P$ ,  $F$ ,  $F_B$ , and  $D_s$  yielded mean scores of 56, 70, 79, and 80, respectively.  $O-S$  with a mean score of 128 was mildly elevated whereas  $F-K$  with a mean score of 0.29 was below cutoffs indicative of symptom overreporting. Thus, of the validity scales,  $F_P$  and  $F-K$  appeared to be the most independent of psychopathology.

Elhai et al. (2000) compared the MMPI-2 validity scores of 124 veterans diagnosed with PTSD to those of students instructed to fake PTSD. This sample was drawn from a larger data set shared with the previous study, so was not completely independent. In addition, the compensation-seeking status of participating veterans was not reported; previous studies suggest, however, that CS veterans are likely present in this study (Frueh et al., 1996; Frueh, Hamner, Cahill, Gold, & Hamlin, 2000).  $F_P$  was the second strongest individual discriminator between the two groups ( $R^2 = .20$ ), though it did not enter the stepwise discriminant analysis conducted on all validity scales.  $F_P$ 's discriminative power was second only to that of  $F-K$  ( $R^2 = .21$ ). Consistent with the results obtained by Frueh et al. (1997),  $F_P$  was elevated but still yielded the lowest score of all validity measures under conditions where actual psychopathology was high and symptom overreporting was expected to be moderate. Mean scores on  $F_P$ ,  $F$ ,  $F_B$ , and  $D_s$  for veterans diagnosed with PTSD were 74, 94, 82, and 87, respectively. Under conditions where actual psychopathology was low and symptom overreporting was high (students instructed to fake PTSD),  $F_P$  was extremely elevated. Mean scores on  $F_P$ ,  $F$ ,  $F_B$ , and  $D_s$  were 98, 112, 92, and 100, respectively.

The present study represents a partial replication and extension of Arbisi and Ben-Porath's work (Arbisi & Ben-Porath, 1995, 1997) using the  $F_P$  scale in veterans with and without PTSD. It used a larger data set ( $N = 423$ ) than previous studies to examine the frequency with which participants, organized by PTSD diagnostic status and compensation-seeking status, exceeded a range of commonly used cut-off scores for MMPI-2 validity scales. The goal was to provide more concrete guidance in interpreting MMPI-2 validity scores when assessing PTSD in veterans where compensation-seeking status is known.

## METHOD

Four hundred ninety-five male veterans, seen for clinical services at the Behavioral Science Division of the National Center for PTSD, participated in this study. Participants completed the MMPI-2, the Beck Depression Inventory (BDI; Beck, Ward, Mendelson, Mock, & Erbaugh, 1961), the Mississippi Scale for Combat-Related PTSD (M-PTSD; Keane, Caddell, & Taylor, 1988), and the Clinician-Administered PTSD Scale (CAPS; Blake et al., 1995). Sixty-eight participants whose compensation-seeking status could not be determined were excluded from the study. Four participants with MMPI-2 TRIN *T*-scores over 100 or VRIN *T*-scores over 80 were also excluded, leaving 423 participants in all. Of these, 341 (81%) served during the Vietnam era, 54 (12%) served prior to the Vietnam era, and 28 (7%) served after the Vietnam era. Mean age was 47.3 ( $SD = 9.0$ ) years; this did not differ significantly by PTSD diagnostic status. However, CS veterans were slightly older (2.1 years) than NCS veterans,  $F(1, 418) = 4.53, p < .05$ .

Compensation-seeking status was determined by interview and self-report. Consistent with previous studies (e.g., Frueh et al., 1997), participants were classified as compensation-seeking if they had already filed or were planning to file for a new or an increased service-connected disability for PTSD. Two hundred ninety-seven (70%) veterans in the sample were classified as compensation-seeking, 126 (30%) as noncompensation seeking. Forty-seven (37%) NCS participants had a VA disability ranking. Fifteen of these were service-connected for PTSD (Median % disability rating = 30), five were service-connected for a non-PTSD psychiatric disability (Median % disability rating = 50), and 27 were service connected for medical disability (Median % disability rating = 20). Thus, it was possible to be classified as NCS and be service-connected provided that additional service connection was not being sought at the time of the assessment.

PTSD diagnoses were made using *DSM-IV* criteria by a clinical team consisting of doctoral-level psychologists with expertise in PTSD and extensive experience conducting diagnostic interviews, and by predoctoral psychology interns who were trained and supervised by the psychologists. PTSD diagnoses were based on chart review, clinical interview, and the CAPS structured diagnostic interview. Because this study was conducted as part of a clinical service, interviewers were not blind to MMPI-2 scores, although the clinical interviews were administered without reference to MMPI-2 responses. Interrater reliability data on the CAPS were not collected during this study; however, the psychometric properties of the CAPS are already well established within this research group at

the same setting (Blake et al., 1995). Two hundred ninety-five (70%) veterans in the sample were diagnosed with PTSD.

The presence of Axis I disorders other than PTSD was assessed using the Structured Clinical Interview for *DSM-III-R* (SCID; Spitzer, Williams, & Gibbon, 1987), clinical interview or both. Because of the large number of participants, comorbid disorders were categorized as anxiety disorders (panic disorder, agoraphobia, specific phobia, social anxiety disorder, and generalized anxiety disorder), depressive disorders (major depressive disorder, bipolar disorder, dysthymia), psychotic disorders (schizophrenia, schizophreniform disorder, schizoaffective disorder, delusional disorder), or substance-related disorders. Eighty-six percent of veterans with PTSD and 56% of veterans without PTSD had at least one non-PTSD Axis I diagnosis. Thus, of the veterans without PTSD, just under half received no Axis I diagnosis. The two groups did not differ in rates of psychotic disorders or substance-related disorders. However, veterans with PTSD were significantly more likely to have a comorbid depressive disorder ( $\chi^2(1) = 15.03, p < .001$ ). Nearly half (48%) of the veterans with PTSD met criteria for one of the diagnoses in this category as compared to only 28% of veterans without PTSD. Veterans with PTSD also trended towards having more anxiety disorders than veterans without PTSD;  $\chi^2(1) = 3.37, p = .07$ . Twenty-three percent met criteria for one or more anxiety disorder whereas only 16% of veterans without PTSD met these criteria.

## RESULTS

Multivariate effects for PTSD and CS status on MMPI-2 validity scales were first examined using profile analysis. Profile analysis is an application of multivariate analysis of variance that allows for examination of between and within-participants effects as well for tests of parallelism. The test of parallelism is the test of interaction (e.g., Do different groups produce different patterns of scores across dependent measures?; Tabachnik & Fidell, 1996). In the present study, profile analysis was used to test whether patterns of scores across MMPI-2 validity scales varied as a factor of CS or PTSD status. To meet the requirement of commensurability, validity scales scores of the MMPI-2 were standardized (*z*-scores).

### PTSD Diagnostic Status

To examine the effects of PTSD diagnostic status on MMPI-2 validity scale scores, a profile analysis was conducted with PTSD diagnosis as the between groups

**Table I.** Means, Standard Deviations, *F*, and *r* Values for Validity Indices of PTSD Patients and Nonpatients

Scale	<i>M</i>	<i>SD</i>	<i>F</i>	<i>r</i>
<b>F</b>				
PTSD	89.29	21.53	54.23***	.34***
Non-PTSD	72.66	21.20		
<b>F<sub>B</sub></b>				
PTSD	92.53	23.46	62.54***	.36***
Non-PTSD	72.78	23.90		
<b>F-K</b>				
PTSD	8.55	10.36	39.74***	.29***
Non-PTSD	1.41	11.45		
<b>O-S</b>				
PTSD	159.74	70.39	38.37***	.29***
Non-PTSD	109.55	87.68		
<b>Ds</b>				
PTSD	78.79	15.43	38.90***	.29***
Non-PTSD	68.18	17.79		
<b>F<sub>P</sub></b>				
PTSD	66.06	19.31	14.65***	.18***
Non-PTSD	58.33	18.50		

\*\*\**p* < .001.

factor and validity scales as the within-subjects factor. Table I presents the means, standard deviations, *F*, *p*, and effect size *r* for PTSD and non-PTSD veterans on all MMPI-2 validity scales. Using Hotelling's criterion, the two diagnostic groups (PTSD and non-PTSD) were found to deviate significantly from parallelism,  $F(5, 417) = 7.46$ ,  $p < .001$ . Post hoc analyses conducted using multiple one-way ANOVAs indicated that veterans who received a PTSD diagnosis scored significantly higher than did non-PTSD veterans on all MMPI-2 validity scales ( $p$ 's < .001). Additional post hoc analyses of the within-subjects effect of validity scales were also conducted using multiple paired *t* tests. These found that for both PTSD and non-PTSD veterans, *F<sub>P</sub>* yielded significantly lower scores than *F*, *F<sub>B</sub>*, or *Ds* ( $p$ 's < .001). Finally, *Z* values for correlated correlations (Meng, Rosenthal, & Rubin, 1992) indicated that *F<sub>P</sub>* correlated less strongly with PTSD diagnostic status than did *F*, *F<sub>B</sub>*, *Ds*, and *F-K*, but not *O-S* ( $p$ 's < .01).

In terms of absolute scale elevations, among non-PTSD veterans, only scales *F* and *F<sub>B</sub>* were elevated, though not extremely so. Among PTSD veterans, however, *F* and *F<sub>B</sub>* were extremely elevated whereas other validity scales produced less pronounced elevations (*Ds*, *F-K*, *O-S*) or were not elevated (*F<sub>P</sub>*).

### Compensation-Seeking Status

The profile analysis examining differences between CS and NCS veterans on the MMPI-2 validity scales

**Table II.** Means, Standard Deviations, *F*, and *r* Values for Validity Indices by Compensation-Seeking Status

Scale	<i>M</i>	<i>SD</i>	<i>F</i>	<i>r</i>
<b>F</b>				
CS	88.00	22.40	29.23***	.26***
NCS	75.45	20.42		
<b>F<sub>B</sub></b>				
CS	90.37	24.64	24.06***	.23***
NCS	77.55	24.48		
<b>F-K</b>				
CS	8.36	10.96	33.13***	.27***
NCS	1.76	10.33		
<b>O-S</b>				
CS	160.43	73.57	43.95***	.31***
NCS	107.13	80.23		
<b>Ds</b>				
CS	78.38	16.79	29.36***	.26***
NCS	68.97	15.22		
<b>F<sub>P</sub></b>				
CS	66.02	20.16	14.46***	.18***
NCS	8.31	16.24		

\*\*\**p* < .001.

yielded a significant effect for levels,  $F(1, 421) = 35.26$ ,  $p < .001$  but not for parallelism  $F(5, 417) = 1.93$ ,  $p = .09$ . Table II presents the means, standard deviations, *F*, *p*, and *r* values for CS and NCS veterans on all MMPI-2 validity scales. Follow-up post-hoc analyses conducted using multiple one-way Analyses of Variance (ANOVAs) found that, consistent with previous studies (Frueh et al., 1996, 1997), CS veterans scored significantly higher than did NCS veterans on all MMPI-2 validity scales.

In contrast to previous studies, CS veterans were more likely to be diagnosed with PTSD than were NCS veterans,  $\chi^2(1) = 7.53$ ,  $p < .01$ ; OR = 1.90 (95% CI = 1.04–3.46). Seventy-four percent of CS veterans and 60% of NCS veterans met *DSM-IV* criteria for PTSD.

### *F<sub>P</sub>*, *F*, *F<sub>B</sub>*, and *Ds* Cutoff Indices by PTSD Diagnosis and Compensation-Seeking Status

Table III shows the frequencies of participants scoring above traditional cutoff points on scales *F*, *F<sub>B</sub>*, *F<sub>P</sub>*, and *Ds*. Among veterans with PTSD, Cochran's *Q* indicated that there were differences between the numbers of veterans at each cutoff with the exception of 120 where comparisons could not be made because of the low *n* in each of the *Ds* and *F<sub>P</sub>* cells. Post hoc tests, consisting of multiple pairwise comparisons using Cochran's *Q*, indicated that significantly fewer veterans exceeded cutoffs of 70, 80, 90, and 100 with *F<sub>P</sub>* than with *F*, *F<sub>B</sub>*, or *Ds* ( $p$ 's < .001). When using 110 as a cutoff, *F<sub>P</sub>* and *Ds* yielded similar numbers

Table III. Frequencies of F, F<sub>B</sub>, F<sub>P</sub>, and Ds at Established Clinical Cutoff Points by PTSD Diagnosis and Compensation-Seeking Status

Scale	Scores					
	>70	>80	>90	>100	>110	120
<b>PTSD</b>						
F	75.9	61.7	48.1	34.6	21.0	13.2
F <sub>B</sub>	80.3	64.7	53.9	41.7	33.9	27.1
F <sub>P</sub>	29.8	20.7	14.6	6.1	2.7	1.7
Ds	70.2	44.4	26.4	11.2	1.0	0.0
Q <sup>a</sup>	300.09***	253.17***	215.15***	214.53***	188.76***	—
<b>Non-PTSD</b>						
F	45.3	27.3	18.0	11.7	9.4	8.6
F <sub>B</sub>	46.1	32.0	22.7	18.0	10.9	8.6
F <sub>P</sub>	12.5	10.9	8.6	5.5	3.9	1.6
Ds	44.5	18.8	10.2	7.0	2.3	0.8
Q <sup>a</sup>	83.68***	39.0***	32.4***	32.07***	23.18***	—
<b>Compensation-seeking</b>						
F	71.7	56.6	45.8	34.0	21.9	14.5
F <sub>B</sub>	76.1	61.6	50.5	40.1	31.6	24.9
F <sub>P</sub>	29.3	21.2	15.5	7.4	3.7	2.0
Ds	69.4	42.8	26.3	13.5	2.0	0.3
Q <sup>a</sup>	286.12***	206.96***	190.38***	194.04***	188.76***	—
<b>Non-Compensation-seeking</b>						
F	54.8	38.9	23.0	12.7	7.1	5.6
F <sub>B</sub>	55.6	38.9	30.2	21.4	15.9	13.5
F <sub>P</sub>	13.5	9.5	6.3	2.4	1.6	0.8
Ds	46.0	22.2	10.3	1.6	0.0	0.0
Q <sup>a</sup>	98.16***	66.07***	57.25***	58.87***	—	—

<sup>a</sup>df = 3.

\*\*\*p &lt; .001.

of veterans above the cutoff and both measures yielded fewer veterans above the cutoff than F or F<sub>B</sub> ( $p$ 's < .001). Among veterans without PTSD, Cochran's  $Q$  indicated that there were differences between the numbers of veterans at each cutoff with the exception of the 110 and 120 cutoffs where comparisons could not be made because of the low  $n$  in each of the Ds and F<sub>P</sub> cells. Post hoc tests indicated that significantly fewer veterans exceeded cutoffs of 70 and 80 with F<sub>P</sub> than with F, F<sub>B</sub>, or Ds ( $p$ 's < .001). At cutoffs of 90 and 100, F<sub>P</sub> and Ds yielded similar numbers of veterans above the cutoffs and both measures yielded fewer veterans above the cutoffs than F or F<sub>B</sub> ( $p$ 's < .001).

Among CS veterans, Cochran's  $Q$  indicated that there were differences between the numbers of veterans at each cutoff, with the exception of 120, where comparisons could not be made because of the low frequencies in each of the Ds and F<sub>P</sub> cells. Post hoc tests indicated that significantly fewer veterans exceeded cutoffs of 70, 80, 90, and 100 with F<sub>P</sub> than with F, F<sub>B</sub>, or Ds ( $p$ 's < .001). When using 110 as a cutoff, F<sub>P</sub> and Ds yielded similar numbers of veterans above the cutoff and both measures yielded fewer veterans above the cutoff than F or F<sub>B</sub> ( $p$ 's < .001).

Among NCS veterans, Cochran's  $Q$  indicated that there were differences between the numbers of veterans at each cutoff with the exception of the 110 and 120 cutoffs where comparisons could not be made because of the low  $n$  in each of the Ds and F<sub>P</sub> cells. Post hoc tests indicated that significantly fewer veterans exceeded cutoffs of 70 and 80 with F<sub>P</sub> than with F, F<sub>B</sub>, or Ds ( $p$ 's < .001). At cutoffs of 90 and 100, F<sub>P</sub> and Ds yielded similar numbers of veterans above the cutoffs and both measures yielded fewer veterans above the cutoffs than F or F<sub>B</sub> ( $p$ 's < .001).

### Correlations of Validity Indices With Measures of Psychopathology

Table IV shows the correlations (with  $\alpha = .001$  to correct for multiple comparisons) between MMPI-2 validity and clinical scales, the Keane-PTSD Scale, the MISS, and the BDI. As can be seen in Table IV, all six validity indices correlated significantly with these measures of psychopathology.  $Z$  values for correlated correlations (Meng et al., 1992) indicated that F<sub>P</sub> correlated less strongly than did F, F<sub>B</sub>, Ds, F-K, and O-S with most measures of

Table IV. Correlations Between F, F<sub>B</sub>, F<sub>P</sub>, Ds, F-K, O-S, and Other MMPI-2 Scales in the Total Sample

Scale	F	F <sub>B</sub>	F <sub>P</sub>	Ds	F-K	O-S
1 (Hs)	.36**	.35**	.25**	.43**	.31**	.42**
2 (D)	.48**	.51**	.22**	.52**	.46**	.62**
3 (Hy)	.23**	.26**	.13	.30**	.15	.24**
4 (Pd)	.58**	.54**	.32**	.57**	.49**	.48**
5 (Mf)	.18	.17	.05	.26**	.14	.20**
6 (Pa)	.71**	.68**	.56**	.66**	.70**	.67**
7 (Pt)	.65**	.69**	.40**	.71**	.58**	.69**
8 (Sc)	.85**	.82**	.63**	.85**	.79**	.78**
9 (Ma)	.53**	.52**	.50**	.53**	.53**	.41**
0 (Si)	.54**	.62**	.30**	.62**	.59**	.68**
PTSD-Keane	.83**	.84**	.51**	.85**	.84**	.86**
Beck Depression Inventory	.67**	.69**	.44**	.67**	.64**	.64**
Mississippi scale	.66**	.66**	.43**	.63**	.64**	.61**

\*\* $p < .001$ .

psychopathology ( $p$ 's  $< .01$ ), with the exception of scale 9 (no differences across validity measures), scale 1 ( $F_P = F_B$  and  $F-K$ ), and scale 3 ( $F_P = F$ ,  $F-K$ , and  $O-S$ ). Thus,  $F_P$  appears to be less sensitive to actual pathology than are  $F$ ,  $F_B$ ,  $Ds$ ,  $O-S$ , and  $F-K$ .

## DISCUSSION

The present data suggest that the  $F_P$  scale is less sensitive to psychopathology than are alternate overreporting indices such as  $F$ ,  $F_B$ ,  $F-K$ ,  $Ds$ , and  $O-S$ , and thus may be of greater utility in the assessment of PTSD in veterans. Among veterans diagnosed with PTSD,  $F_P$  was the only validity scale not elevated.  $F_P$  also overlapped less with psychiatric symptoms than did other validity scales. Thus,  $F_P$  may be a more valid measure of overreporting than  $F$ ,  $F_B$ ,  $F-K$ ,  $Ds$ , and  $O-S$ , in that  $F_P$  is less likely to be artificially elevated for individuals in extreme distress because of frank psychopathology.

The finding that CS was associated with extreme elevations across most clinical and validity scales is consistent with previous research (Frueh et al., 1996, 1997), as is the finding that CS veterans score higher than NCS veterans on these measures. Additionally, differences were found between validity indices in the proportions of CS/NCS veterans scoring at or above MMPI-2  $T$ -score cutoffs.  $F_P$  produced from 60 to 90% fewer veterans than  $F$  or  $F_B$  at or above each  $T$ -score cutoff. However,  $F_P$  and  $Ds$  performed similarly at the higher cutoffs. NCS veterans as a group also produced significantly fewer scores at each cutoff than CS veterans. The use of CS as a measure of secondary gain is admittedly an imprecise variable at best, and its presence should not call the validity of participants' responses into question, per se. It is just as likely that the more severely impaired patients are simply

more likely to seek compensation. Similarly, the absence of a request to upgrade or apply for a service-connected disability should not imply the absence of secondary gain. In this study, more than one-third of NCS veterans were service-connected. Though they were not requesting a change in status at the time of assessment, these veterans still had incentives to provide information that would not adversely affect their service-connected status. Despite these caveats, however, one cannot ignore that CS veterans do experience an external incentive to exaggerate their symptoms that most likely exceeds that of NCS veterans.

The finding that CS veterans were more likely than NCS veterans to be diagnosed with PTSD is inconsistent with previous research. Caution, however, is warranted in generalizing these results, since the National Center for PTSD draws veterans from across the east coast specifically for CS evaluations. As such, samples selected from this site may yield an artificially high rate of CS veterans as well as CS veterans diagnosed with PTSD. However, this finding, if replicated, would tend to weaken the association between CS and symptom overreporting because it provides evidence that CS veterans are actually more symptomatic than NCS veterans.

Previous studies have used the pattern of extreme scores on validity and clinical measures coupled with lower rates of PTSD diagnosis to suggest a relatively high rate of symptom overreporting among CS veterans (estimated at 20 to 30%). However, estimates based on the percentage of CS veterans not receiving a PTSD diagnosis likely overestimate actual rates of symptom overreporting since they do not account for alternate explanations for not receiving the PTSD diagnosis. For example, CS veterans not diagnosed with PTSD may well suffer from psychiatric disorders other than PTSD; thus, it would be inappropriate

to conclude that these participants are faking PTSD. Obtaining more meaningful estimates of symptom overreporting requires an identified group of malingering veterans to provide comparison data and norms. To date, no such group has been described in the literature. Efforts to use trained fakers as an analog group have thus far focused on college student populations and mental health professionals (Fairbank, McCaffrey, & Malloy, 1985) and it can be argued that these research participants trained to fake PTSD may respond differently than would veterans trained to do the same. Thus it appears that current research practices may not yield definitive estimates of symptom overreporting among veterans evaluated for PTSD.

This is pertinent to the validity scale profiles generated in this study by a cut score of  $F_p \geq 90$  for CS and NCS veterans. Both CS and NCS veterans with  $F_p$  scores over 90 produce a pattern of responses characteristic of symptom overreporting. Nonetheless, research on the utility of  $F_p$  to identify overreporting in veterans is in the early stages.  $F_p$  should be used in context with other information such as current or planned CS status, to derive more accurate predictions of symptom overreporting. Two other caveats to using  $F_p$  apply. First, it is not yet known whether  $F_p$  results in an acceptable number of false negatives (i.e., the erroneous conclusion that a patient is reporting honestly). Second, without item analysis it is not clear whether the items selected for  $F_p$  are ideally suited to detect PTSD-related overreporting. Nevertheless, the present results suggest that  $F_p$  may be a useful adjunct to the traditional MMPI-2 validity scales in the assessment of PTSD in veteran populations. Recent data suggest that modification of  $F_p$ , for example, omitting items that overlap with the L scale, may enhance sensitivity to symptom exaggeration (Gass & Luis, 2001). Item analysis of the  $F_p$  scale in veterans with PTSD may be a fruitful area of future study.

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